

LETTER TO THE EDITOR

# Is there a gold standard to assess haemodynamic retina perfusion?

## *Esiste un gold standard per valutare la perfusione emodinamica della retina?*

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PAROLE CHIAVE: BPPV, ecocolor doppler, arterie vertebrali, OCTA, vasculopatie

Dear Editor,

I thank Prof. Martini for having raised some criticism of our work that had the objective of highlighting the aetiopathogenesis of the most frequent peripheral vertiginous pathology <sup>1</sup>.

When a great scientist criticises a paper, it means that it is worth reading.

The first observation concerns retinal fluorangiography (FA), considered by Prof. Martini to be outdated, which lost its investigative value soon after the introduction of optical coherence tomography angiography (OCTA). However, this is not entirely true.

OCTA has been in use for a few years and is currently a widely used exam, especially considering its remarkable diagnostic utility, but in reality, as Wei himself, cited by Prof. Martini, writes "*multiple methods are used by researchers for assessment of (retinal) blood flow, but a gold standard is lacking*" <sup>2</sup>.

One of the main deficiencies of OCTA is related to its limited field of view, suggesting a primary application in disorders affecting the macular region. Even wide field OCTA scans and montage of wide field OCTA scans of the posterior pole do not extend to the retinal periphery, which are easily and completely imaged by fluorescein angiography. Moreover, OCTA is influenced by the velocity of flow, and thus a slow flow inside vessels leading to a lack of signal could be misinterpreted as non-perfusion. Thus, FA offers a more detailed and complete perfusion status of the retina <sup>3</sup>. Our choice to use FA was therefore determined not "from a lack of updated scientific literature search in absence of an ophthalmologist within the authors research group", but by willingness to use a well-structured, complete test backed by solid scientific literature that can give a complete and unequivocal result. The absence of a positive FA result was expected and is not surprising. It is partly anatomically explainable <sup>4</sup> because the ophthalmic artery caliber is about 2 mm in diameter <sup>5</sup>, while the average calibre of the internal auditory artery is 0.19 mm <sup>6</sup> (range 0.15-0.24 mm). It is thus much more sensitive to flow reductions than the eye that is affected when the damage has already occurred. Micro-aneurysms, retinal haemorrhages and retinal arteriolar narrowing, in fact, may be markers for *concomitant* cerebral microangiopathy <sup>7</sup>. In other words, the labyrinth is a peripheral sensor, which due to its "chronic ischaemia" can indicate a vascular disorder of the microcirculation much earlier than eye. This is the peculiarity that emerges from our study and that indicates

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### Conflict of interest

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how echocolor Doppler of the vertebral artery can confirm or not that benign paroxysmal positional vertigo (BPPV) is actually a risk factor for ischaemic stroke<sup>8,9</sup>.

We have almost finished a study, which I hope to publish as soon as possible, which indicates that in lack of oxygenation the vestibular damage manifests itself in a subclinical manner.

The second observation concerns the audiological aspect. I agree with Prof. Martini about the possibility of showing audiological data relating to the cases examined, but we tried not to burden the work with too much data that could distract the reader from the core of the research. On the other hand, the study group was composed of patients with recurrent BPPV which, as a rule, is not associated with hearing damage. In reality, the appearance of unilateral or bilateral auditory signs with vertigo<sup>10,11</sup> indicates a more severe prognosis, due to the concrete possibility of ischaemia, in patients with acute vestibular deficit or auditory symptoms and not with BPPV. However, I thank Prof. Martini for the suggestion that I will certainly follow in the future to improve the quality of my research.

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